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be due to the overlapping of cycles of activity, as demanded by Spörer's law.

6. Nor is it apparently due to the existence of a series of "spot-activity tracks," the subsidence of activity from maximum to minimum being zonal and the foci of activity in the zones occurring in different longitudes.

The Rotation Period of Saturn. *By* W. F. Denning.

The conspicuous spots visible on *Saturn* in 1903 offered an opportunity for accurately determining the rotation period of the planet which it was most desirable to utilise to the best possible advantage. I regretted, therefore, to see that Professor Hough had apparently misidentified certain of the markings, and deduced a rotation period in excess of the correct value (*Monthly Notices*, 1904 December).

Professor Hough places an exclusive reliance on the micrometric method of taking transits, and gives the times to tenths of a minute, but the number of the observations he employs are so limited that at least very grave doubts must exist as to his identifications. He regards all eye-estimated transits of markings on *Jupiter* and *Saturn* as useless, though Professor Barnard, Mr. Stanley Williams (*Monthly Notices*, 1904 March), and others have clearly shown that the latter are comparable with the former in regard to accuracy.

It is indeed quite fair to say that if all the micrometrically measured transits of *Jupiter's* spots were put on one side, and only the eye-estimated transits retained, our knowledge of Jovian phenomena would not suffer in the least!

The conclusions I arrived at respecting the identification and rotation period of the spots on *Saturn* (*Monthly Notices*, 1904 March) are, I believe, perfectly sound, and this is also the opinion of several well-qualified observers who have not only obtained transits, but have pretty thoroughly compared and investigated the details.

As I have previously stated, the identification of the individual objects is a point of greater importance than the method of taking transits; and to be certain of the correctness of the identifications a fair number of observations must be accumulated. The materials adduced by Professor Hough in his paper (*Monthly Notices*, 1903 December) are obviously too scanty for the individual spots to be followed with certainty. The spots were quite numerous, some of them pretty close together, and liable to variation in brightness, shape, and motion. Professor Hough relies upon an observation, after an interval of three weeks, of a "faint, difficult" spot on August 19 as being the same as Barnard's, though it was more than 5,000 miles nearer the

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equator, very much smaller than the object named, and (as I have endeavoured to prove in *Monthly Notices*, January 1904, p. 241) 25°, or 45^m, east of it.

I must confess myself surprised at several of the statements made by Professor Hough, but will content myself with particular reference to one. He says (*Monthly Notices*, 1904, p. 552) that my "suggestion that discordant observations may be due to oscillation in position of the spots on *Jupiter* and *Saturn* is not sound." Now Professor Hough himself has proved by micrometric measures the oscillation of the spots on *Jupiter*! In his annual report of the Dearborn Observatory, 1882, p. 50, he distinctly remarks of a large white spot on *Jupiter* that, "observed continuously for a period of 252 days, it indicated sudden deviations in its apparent place, probably due to changes of shape. The comparison with the ephemeris shows a maximum displacement of 16^m, or more than $3''$ at mean distance." The apparently irregular movement of the markings on *Jupiter* (to whatever cause it may be due) is a fact well known to all students of the planet, and it is highly probable (if indeed it was not sufficiently proved by the observations in 1903) that the same thing occurs on *Saturn.*

I hope to return to this subject with greater detail, but fear there is little prospect of unanimity between Professor Hough and other observers so long as he holds his present views on the various methods of taking transits.

Bishopston, Bristol:
1904 *May* 20.

Note on the Gyroscopic Collimator of Admiral Fleuriais.

By M. E. J. Gheury.

Admiral Fleuriais's Gyroscopic Collimator is not by any means new, and although it has been greatly improved lately by Messrs. Ponthus and Therrode, of Paris, who kindly lent me one of their latest patterns, these improvements have left unaltered the characteristic features of the original collimator, being chiefly concerned in making the apparatus practical and easy in working, while in the hand of a skilful observer the results obtained with the latest form are of remarkable accuracy.

However, although a very interesting and elegant solution of the problem that sprung up with the requirements of modern navigation, the importance of which cannot be overrated, it is, I find, very little known either by seamen or by non-professional people interested in science generally. This is a pity, seeing the ingenuity displayed in overcoming the many obstacles preventing the realisation of a reliable artificial horizon.

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